NOTES ON THE CHEYLETIDAE (ACARINA, TROMBIDOIDEA) OF AUSTRALIA AND NEW ZEALAND, WITH DESCRIPTIONS OF NEW SPECIES

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Fig. 1–9.

This family of microscopic mites has hitherto been unrecorded from Australia or New Zealand. They may be distinguished by the morphological characters given in the following family diagnosis.

Comparatively little is known of their life-history. Many are free-living or predatory on other mites or on insects, while others are parasitic on animals or birds, or are predatory upon other mites living on or in the fur or feathers of mammals or birds. Rats, mice, bats, and even sheep are affected.

Hitherto none have appeared to be of direct importance to man, but in this paper is described a new species, *Psorergates ovis*, which seems likely to become a serious pest to sheep in Australia.

In the present paper fourteen species are recorded from Australia and one from New Zealand. Of these seven Australian species (and one genus) are described as new. The remainder are cosmopolitan or introduced forms.

Family CHEYLETIDAE Leach 1814.

Leach, W. E. 1814, Tr. Linn. Soc. London, *11*, 399.

Body rounded, oval to fairly elongate, not annulated, of soft texture. Larvae with three pairs of legs, later stages with four pairs. Pseudostigmal organ absent. Palpi four- to five-segmented, free, often forceps-like, tibial-claw present, tarsus thumb-like. Legs short and stumpy or long and slender, without strong spines. Claws two or one, sometimes absent on one or more legs. Body setae often branched or pectinated or fan-like. Terrestrial forms but frequently parasitic or predatory.

Key to the Known Genera.

1. Legs I normal, adapted for walking or tactile use; with 2 or without claws .. .. 2.
   Legs I very short, with a spiral-like claw adapted for grasping hair. Parasitic on mice, rats, bats, etc. .. .. Gen. *Myobia* v. Heyden 1826.
2. Palpi normal, not forming a pair of forceps .. .. 3.
   Palpi forming a pair of forceps .. .. 6.
3. Palpi normal, cylindrical .. .. 4.
   Palpi very short, swollen or conical .. .. 5.
4. Tarsal empodium bipectinate. In quills of birds .. Gen. *Syringophilus* Haller 1880.
   Tarsal empodium as a pectinate V. Subcutaneous on Woodpeckers.
   Gen. *Picobia* Haller 1878 (not Australian).
5. Palpi swollen. Only on birds .. .. Gen. *Sarcopterinus* Raillet 1893.
   syn. *Sarcoborus* Ouds. 1906 (not Australian).
   Palpi conical. On mice and sheep .. .. Gen. *Psorergates* Tyrrell 1883.
6. Palpal tarsus with comb- and sichel-like setae .. .. 7.
   Palpal tarsus without above, only with small ordinary setae Gen. *Cheletiella* Canest. 1886.

7. Palpal tarsus with 2 comb- and 2 sichel-like setae .. .. 8.
Palpal tarsus with 1 comb- and 2 sichel-like setae .. .. 13.
Papal tarsus with 2 sichel-like setae only .. Gen. *Cheletoides* Ouds. 1904a.

8. Dorsal setae feather-like. Free living .. .. .. Gen. *Cheyletus* Latr. 1797.
Dorsal setae in the form of strongly ciliated rods. With eyes
Gen. *Cheletophyes* Ouds. 1914 (not Australian).
Dorsal setae fan-or scale-like, often slender .. .. 9.

9. Legs I normal, with claws, for walking .. .. 10.
Legs I without claws, tactile .. .. 12.

10. Claw of palp internally smooth or with few basal tubereles .. .. .. 11.
Claw of palp pectinate along entire inner edge .. Gen. *Cheletophanes* Ouds. 1904a.

11. One anterior dorsal shield .. .. Gen. *Cheletonella* nov.
Two dorsal shields, one on propodosoma and one on hysterosoma Gen. *Cheletia* Haller 1884.
Three dorsal shields, one on propodosoma and two, side by side, on hysterosoma
Gen. *Cheletomimus* Ouds. 1904a.

12. Palpal claw entirely pectinate along inner margin
Gen. *Cheletogenes* Ouds. 1905 (not Australian).
Palpal claw with basal inner tuberele or smooth .. Gen. *Cheletomorpha* Ouds. 1904a.

13. Two dorsal shields .. .. 14.
Anterior dorsal shield only .. .. .. Gen. *Cheletopsis* Ouds. 1904a.

14. Dorsal shields contiguous and covering entire dorsum
Gen. *Chelonotus* Trt. in Berlese 1893 (not Australian).
Dorsal shields separate, encircled by soft cuticle .. .. 15.

15. Anterior shield trapezoidal .. .. .. Gen. *Acaropsis* Moq.-Tand. 1863.
Anterior shield pentagonal .. .. Gen. *Chelotosoma* Ouds. 1905 (not Australian).

Genus MYOBIA v. Heyden 1826.

von Heyden 1826, col. 613.

MYOBIA MINIOPTERIS sp. nov.

Text-fig. 1 A–E.

Description. Female. Elongate, 578μ by 238μ. Front of head flattened. Dorsal surface with characteristic setae as figured, these arranged 4, 4, 6, 4, 4, those of first and outer members of second row very much asymmetrically broadened at base and with 8–10 longitudinal striations, those of third and fourth rows and the middle pair of second and fifth rows less broadened, outer members of fifth row normal. Outer setae of first and second rows 180μ long, inner of these rows 105μ, remainder 75–90μ long. At apex of body a pair of setae about 510μ long. Ventrally with three pairs of long fine setae, one between coxae III, one just anterior of coxae IV and one just posterior of coxae IV; there is also a pair of small outer setae between coxae III, another pair outside of the third pair of long setae, and a pair of medium setae just before the apex of the body; the lengths of these setae are, first long 90μ, second long 90μ, third long 120μ, short 21μ, medium 51μ. Tarsi and claws of leg I normal for the genus, adapted for clasping hair; of leg II strong and evenly curved; of legs III and IV straighter and scythe-like; two claws on legs II–IV. Tibiae and tarsi of legs III and IV with three and two stout spines at the outer anterior angles. Tip of tarsi I with two stout long blunt setae. This species is remarkable for the prominent and large air cavities at the insertion of the legs. Leg I as figured.

Locality and Host. South Australia: one (type) from *Miniopteris schreibersi* Naracoorte 1893 (R. Fleming); another from *Chalinolobus gouldi* (no precise locality), M 401,506. N.B.: Bat hosts in South Australian Museum collections.

Remarks. Nearest to *M. rollinati* (Poppe) described from the Greater Horse Shoe Bat (*Rhinolophus ferrum equinum*) of Europe, but differs in the form of the longer expanded dorsal setae.

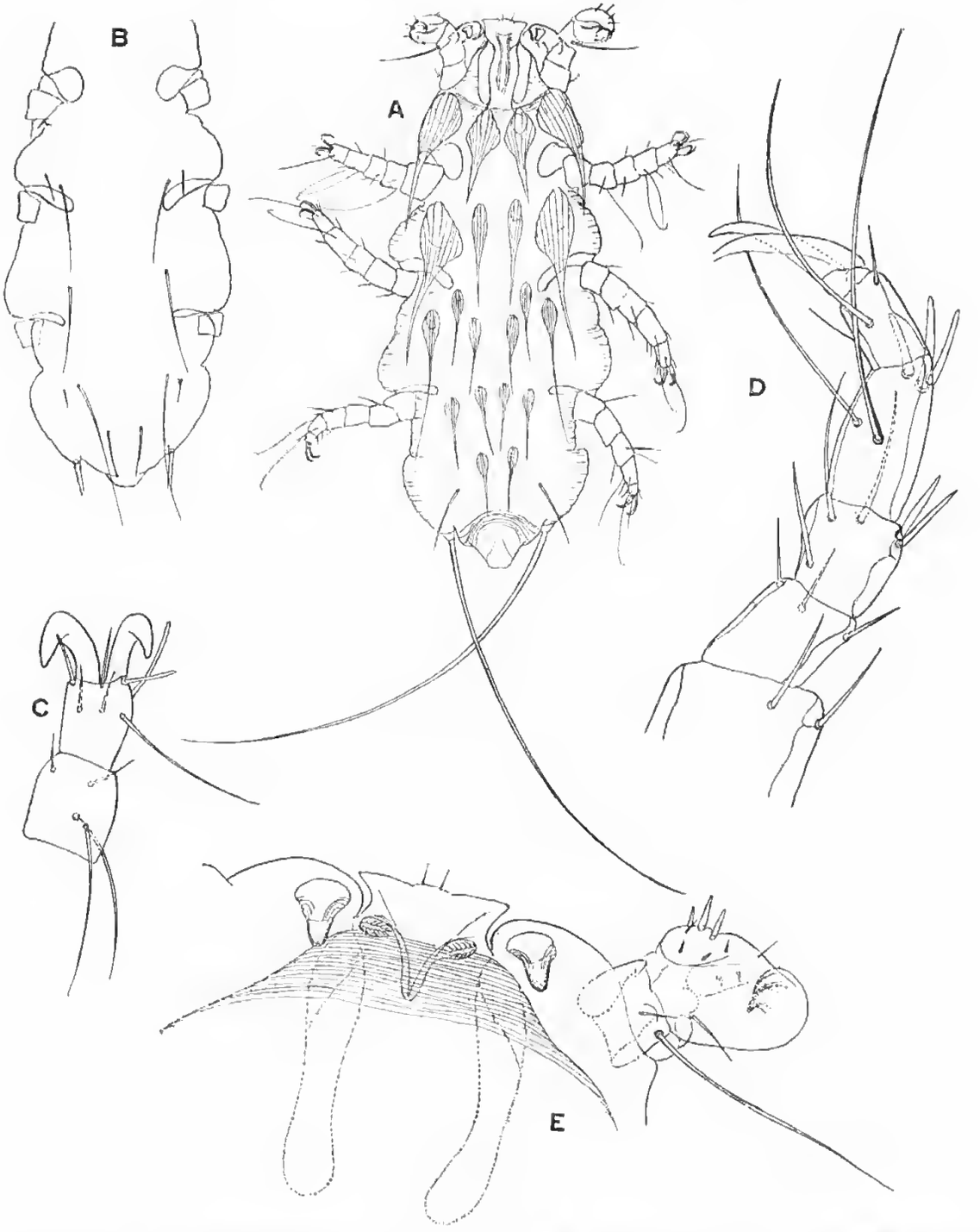

Fig. 1. *Myobia miniopteris* sp.nov. A, Entire dorsal view of female; B, ventral view of same, except gnathosoma and legs; C, tip of leg II; D, leg III or IV; E, capitulum and right palp from above.

MYOBIA CLARA sp. nov.

Text-fig. 2 A–B.

Description. Female. Elongate, length 425μ, width 170μ. Front of head lightly produced, snout-like. Dorsally with 22 setae, arranged 4, 4, 4, 2, 2, 2, 4, 2; all except the two posterior rows simple, as figured, moderately broad basally for rather more than half their length, and only indistinctly longitudinally striated;

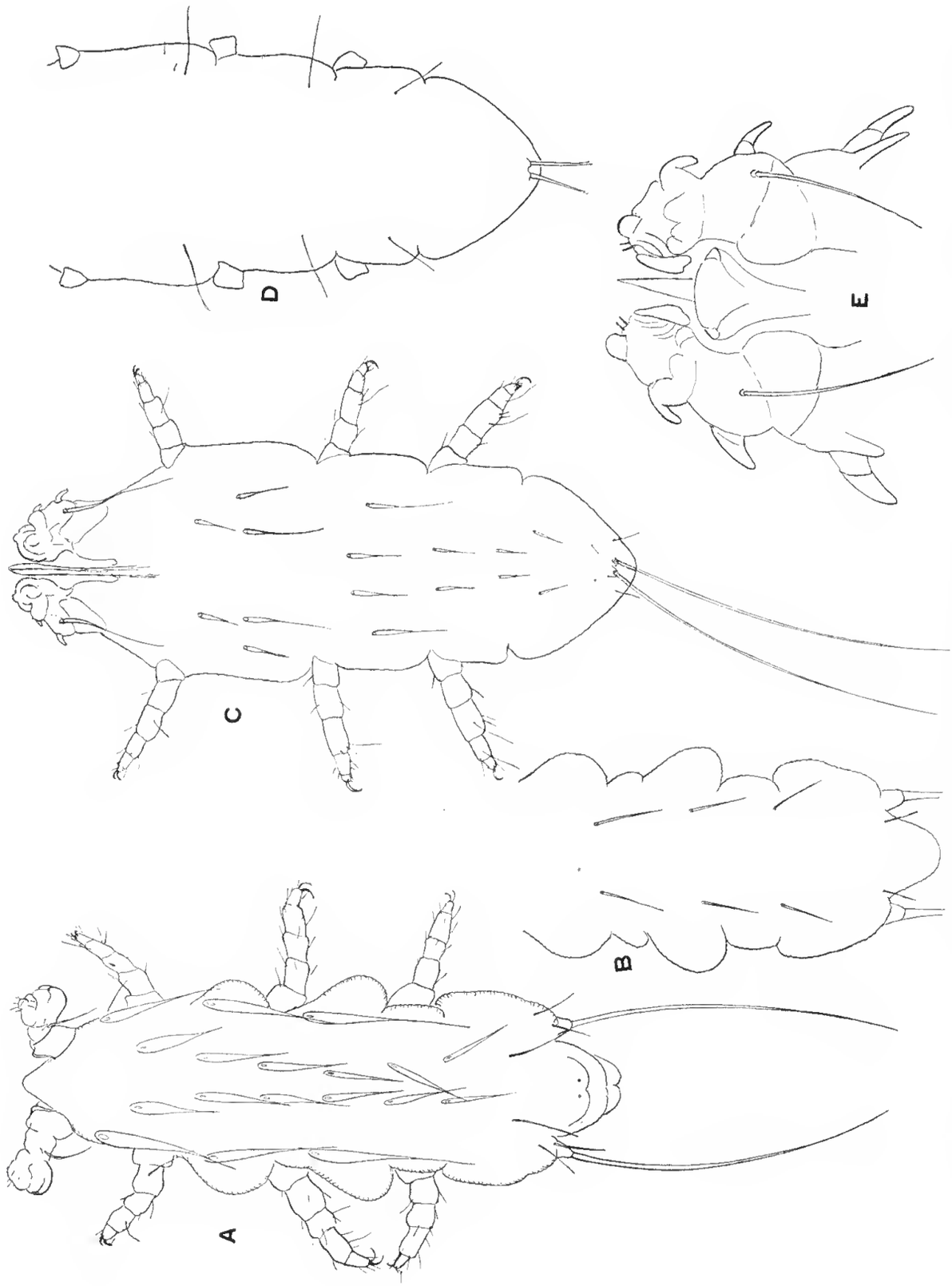

Fig. 2. *Myobia clara* sp.nov. Female: A, entire dorsal view; B, ventral view, except gnathosoma and legs. *Myobia minima* sp.nov. Female: C, entire dorsal view; D, ventral view, except gnathosoma and legs.

outer ones of first three rows 90μ long, the six central pairs 60–75μ, posterior six 60μ. The paired apical abdominal setae 330μ long. Ventrally with four pairs of setae, 60μ long and arranged as figured. Leg I normal for the genus; II to IV with paired claws which are all alike, slender and sichel-like. The prominent air chambers at the insertion of the legs present in the preceding species are absent.

Locality and Host. ? South Australia from bats M499 and 4418–21 in the South Australian Museum collections.

MYOBIA MINIMA sp. nov.

Text-fig. 2C–D.

Description. Female. Elongate, length 340μ, width 136μ. Front of head flattened as in *miniopteris*. Dorsally with 20 setae arranged 2, 4, 4, 2, 2, 2, and then four small fine ones; the first six rows are somewhat thickened basally for not more than half their length; the median pair of the second row and the outer ones of the third row are 75μ long, the others 30–33μ; the pair of long apical setae are 180μ in length. Ventrally with three pairs of long fine setae, 45μ long, as figured, in front of the anterior pair is a pair of very small fine ones on each side. Leg I as figured, adapted for clasping hair; II to IV with only a single claw which is strongly curved and sichel-like. No air chambers at insertions of legs.

Locality and Host. ? South Australia on *Chalinolobus gouldi* M401, 506 in South Australian Museum collections.

MYOBIA CHALINOLOBUS sp. nov.

Text-fig. 3 A–C.

Description. Female. Of squat form, length 323μ, width 238μ. Front of head not flattened. Dorsally with three pairs of long slender setae each of which has a short accessory hairlet at about one-fourth from its tip; medially and anteriorly is a pair of very short setae, while posteriorly there are four short setae. The long dorsal setae are 120μ in length. The apical paired setae are 320μ long. On the venter coxae I with two fine setae, II with three, III with one, IV without any setae; between coxae IV a transverse row of four fine setae, and at apex two more. Leg I normal for the genus, as figured; legs II to IV all with paired stout evenly curved similar claws. At the insertion of the legs are slender invaginations representing air chambers.

Locality and Hosts. Type from *Chalinolobus gouldi*, M401, 506 from South Australia, in the collections of the South Australian Museum.

MYOBIA ENSIFERA (Poppe 1896).

Text-fig. 3D.

Poppe, S. A. 1896, 341.

This is a well-known European species found on rats and mice. In Australia it has been found (1) on laboratory white rats, University, Adelaide, June, 1938 (T.H.J.) and (2) on rats at Cairns, Queensland, 1939 (W.G.H.).

Genus PSORERGATES Tyrrell 1883.

Tyrrell 1883, 332.

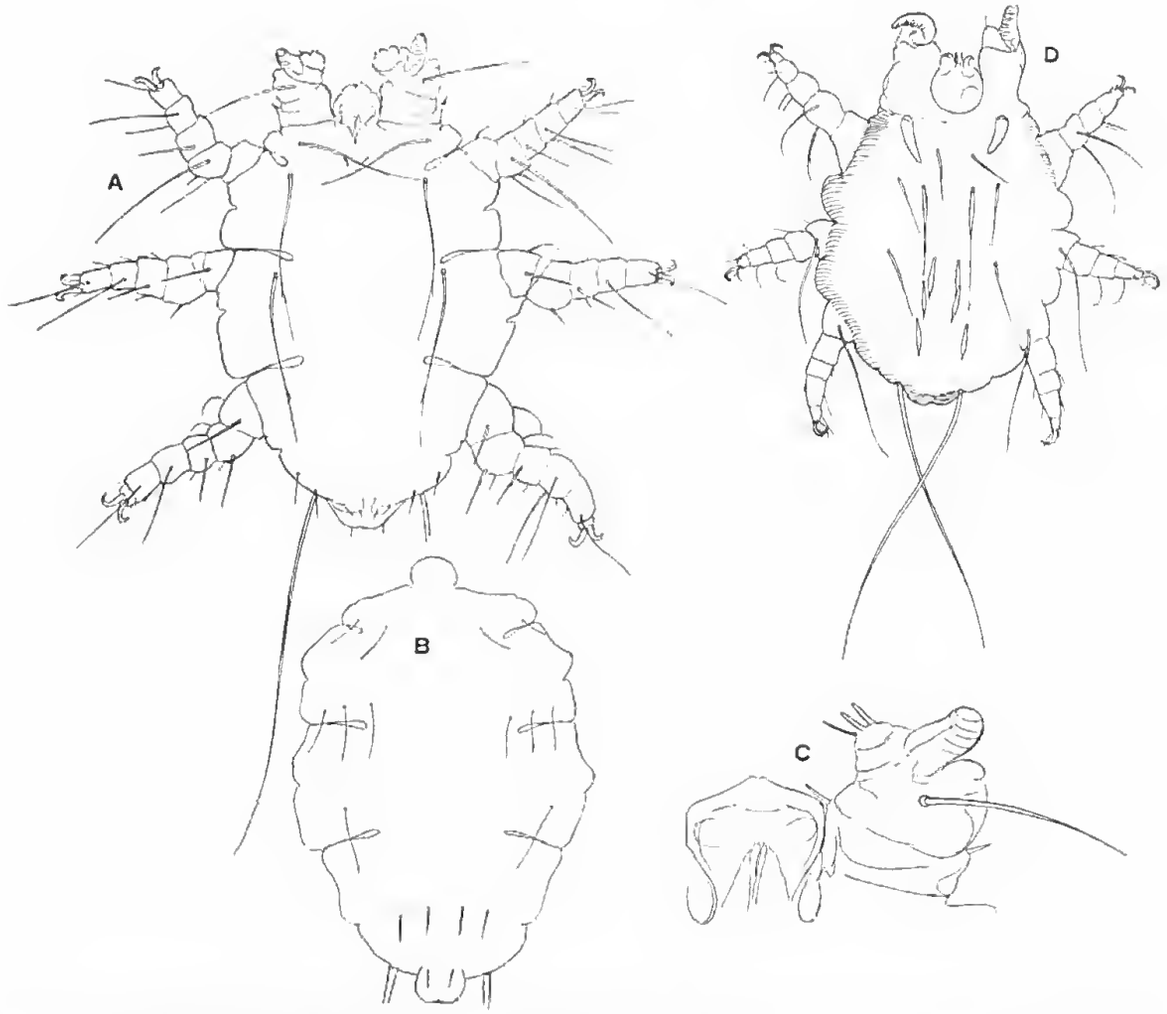

Fig. 3. *Myobia chalinolobus* sp.nov. Female; A, entire dorsal view; B, ventral view, except legs; C, right palp. *Myobia ensifera* Poppe. D, Entire dorsal view of female.

PSORERGATES OVIS sp. nov.

Text-fig. 4 A–J.

Description. General form rounded and flattened, rather narrower than long. Lateral margins indented slightly between the coxae. Claws furnished with paired claws. Palpi short and conical. Penis of male dorsal.

Female. Length 189μ, width 162μ. Palpi as figured, with a short stout somewhat clavate rod-like seta at the outer dorsal angle; tibia with a long and a short seta, and with well chitinized blunt claw. Legs short and stout, femur on outer margin below with a pair of adjacent long setae; tibia with a long outer seta and a stout curved tooth on inner surface; tarsus with outer tooth and two strong claws; all legs alike, but the long tibial seta is much longer on leg IV. Dorsum smooth, except for a narrow outer margin of longitudinally striated cuticle; with four pairs of stout setae as figured. Venter with a pair of short setae in the middle; a single setae on each coxa and apically with two pairs of long (68μ) setae arising from a pair of lobes.

Male. Length 167μ, width 116μ; differs from female only in having but a single pair of long setae apically and ventrally, which are rather shorter than in

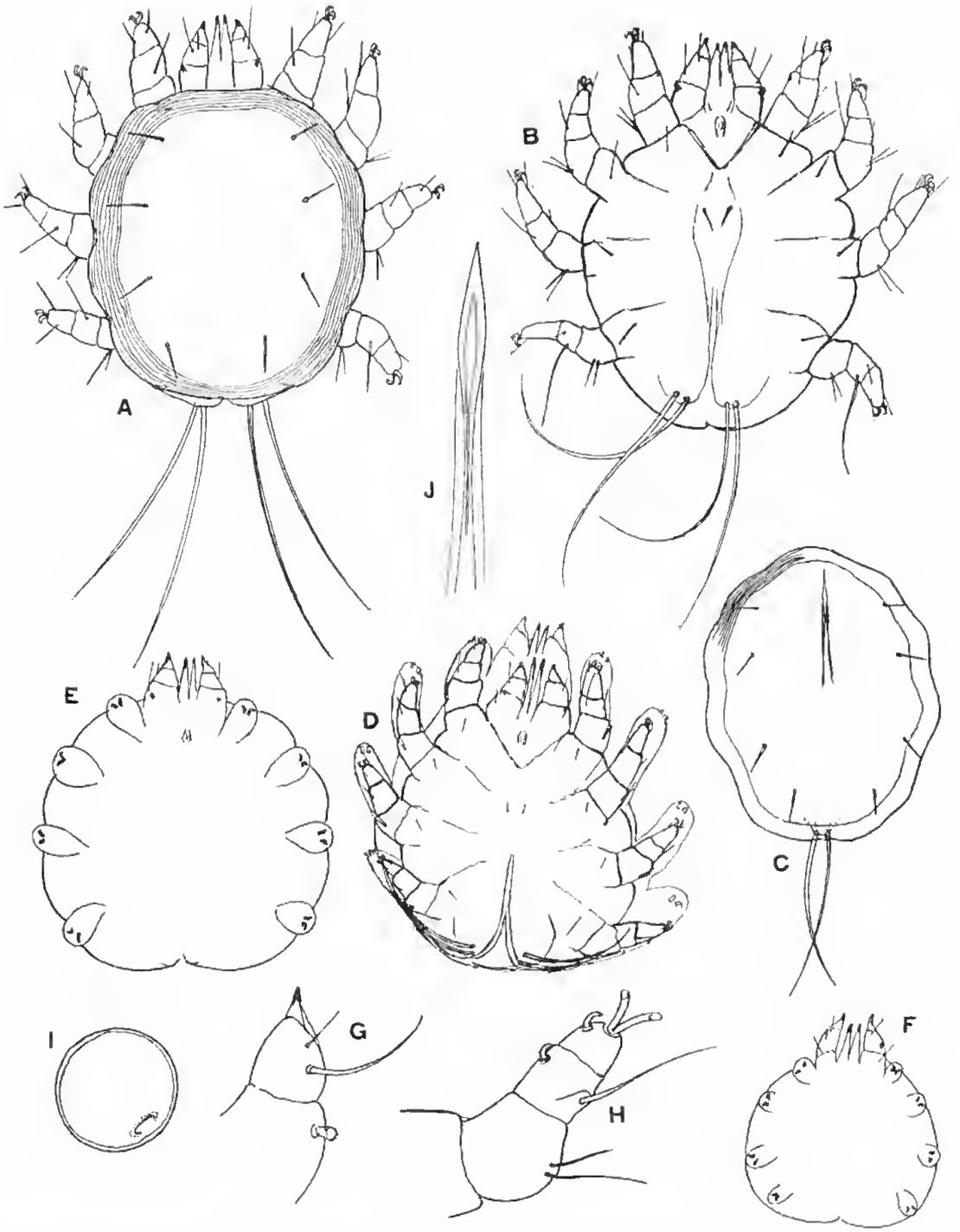

Fig. 4. *Psorergates ovis sp.nov.* A, Entire dorsal view of female; B, ventral view of same. C, Dorsal view of male except legs. D, Adult female within nymphal skin. E, Second nymph, ventral. F, First nymph, ventral. G, Palp from above; H, Leg I; I, ova; J, penis.

the female, and arises from a single medial tubercle. The dorsal penis arises near the middle, and extends almost to the anterior margin as figured.

Ovum. Round as figured, 48μ in diameter.

Larva. Length 108μ, width 95μ, with three pairs of rudimentary legs which are little more than stumps, but are furnished with distinct if rudimentary claws. No dorsal or ventral setae can be observed.

Nymph I. Length 121μ, width 108μ, as figured. With four pairs of legs, still rudimentary but rather more developed. No dorsal or ventral setae.

Nymph II. Length 155μ, width 135μ. Legs still more developed, but showing no signs of segmentation. No dorsal or ventral setae, but in this and the preceding stages the palpal setae are strongly evident. In one specimen of the later nymphal stage the adult female could be observed within the nymphal cuticle (see fig. 6D). Here it will be noticed that the apical long setae are curled within the nymphal skin.

Locality and Host. On sheep, Yass, Goulburn, New South Wales, and Canberra, Aust. Cap. Territory, May, 1941 (H. B. Carter).

Remarks. This species may become of serious import to the sheep industry of Australia. Its economic aspect is being investigated by Mr. H. B. Carter and other officers of the Council for Scientific and Industrial Research at the McMaster Laboratories, Sydney. I am indebted to Dr. Bull and Mr. Carter for bringing this interesting species to my notice, and for affording me the opportunity of describing it.

Its effect upon the sheep is to produce a chronic irritation of the skin, mainly along the sides and flanks, although specimens have been recovered from most regions of the body. The appearance of the fleece is similar to that of infestation by the common biting louse (*Bovicola ovis*).

Genus SYRINGOPHILUS Heller 1880.

Heller 1880, 186.

Goniomerus Michael, A. D. 1890, 405.

SYRINGOPHILUS TOTANI Ouds. 1904.

Text-fig. 5, A–B.

Oudemans, A. C. 1904a. Ent. Bericht. No. 19, 171; 1906, Mem. Soc. zool. Fr., *19*, 36, fig. 7, 8.

This species was described from the quills of the Swallow *Totanus calidris*, probably from France. My material, which was from a Magpie collected at Barringun, New South Wales (no date) by the late Stanley Hirst, does not appear to differ from the description and figures given by Oudemans.

Genus CHEYLETUS Latreille 1796.

Latreille, P. A. 1796, 179.

CHEYLETUS ERUDITUS Schrank 1781.

Text-fig. 5 C–D.

Schrank, F. v. P. 1781, 513.

This species is the type of the genus. It is almost cosmopolitan and occurs in and on various foodstuffs. It is predatory in habit, feeding upon insects and mites infesting the materials. It is frequently to be found in cultures of economic insect pests. I have material from the following Australian localities:

Queensland: On cheese, Brisbane, June, 1932 (F.H.S.R.).
New South Wales: On head of a fly, Sydney, 1909.
Victoria: On imported seeds, Dept. of Agric., Melbourne, August, 1932.
South Australia: In infested wheat, Adelaide, September, 1940.

Genus CHELETIELLA Canestrini 1886.

Canestrini, G. 1886, 170.

CHELETIELLA PARASITIVORAX Megnin 1878.

Text-fig. 5 E–F.

Megnin, P. 1878, 425, pl. xxviii.

This is a well-known predatory species found inhabiting the fur of rabbits where it probably feeds upon the Listrophorid mites living there. It is not yet

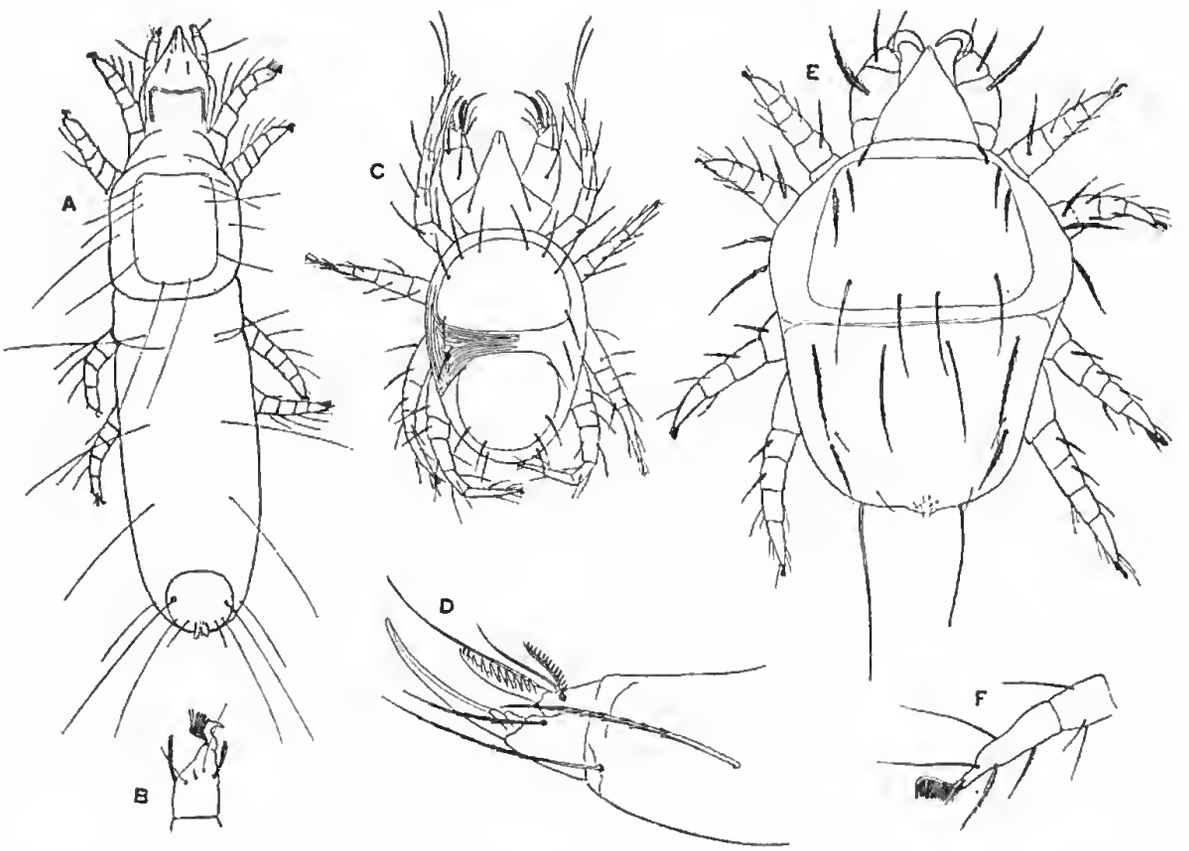

Fig. 5. *Syringophilus totani* Ouds. A, Entire dorsal view of female; B, tarsus. *Cheyletus eruditus* Sehrank. Female; C, dorsal view; D, palp from above. *Cheletiella parasitivorax* Megnin. E, Dorsal view; F, tarsus.

known from Australia, but a few years ago I received material from the fur of Angora rabbits from Auckland, New Zealand (1935 L.M.).

CHELETIELLA PINGUIS Berlese 1889.

Text-fig. 6 A–C.

Berlese, A. 1889.

With somewhat similar habits to the above species, but found upon birds. My Australian material is from the parrot *Platycercus elegans* from Mansfield, Victoria, June, 1933 (A.E.B.).

Genus CHEYLETIA Haller 1884.

Haller, G. 1884, 233, 234.

CHEYLETIA FLABELLIFERA (Michael 1878).

Text-fig. 6 D–E.

Michael, A. D. 1878, 435.

To be found generally in similar habitat to *Cheletiella parasitivorax* and of the same habit. My Australian material was found among the debris of an old

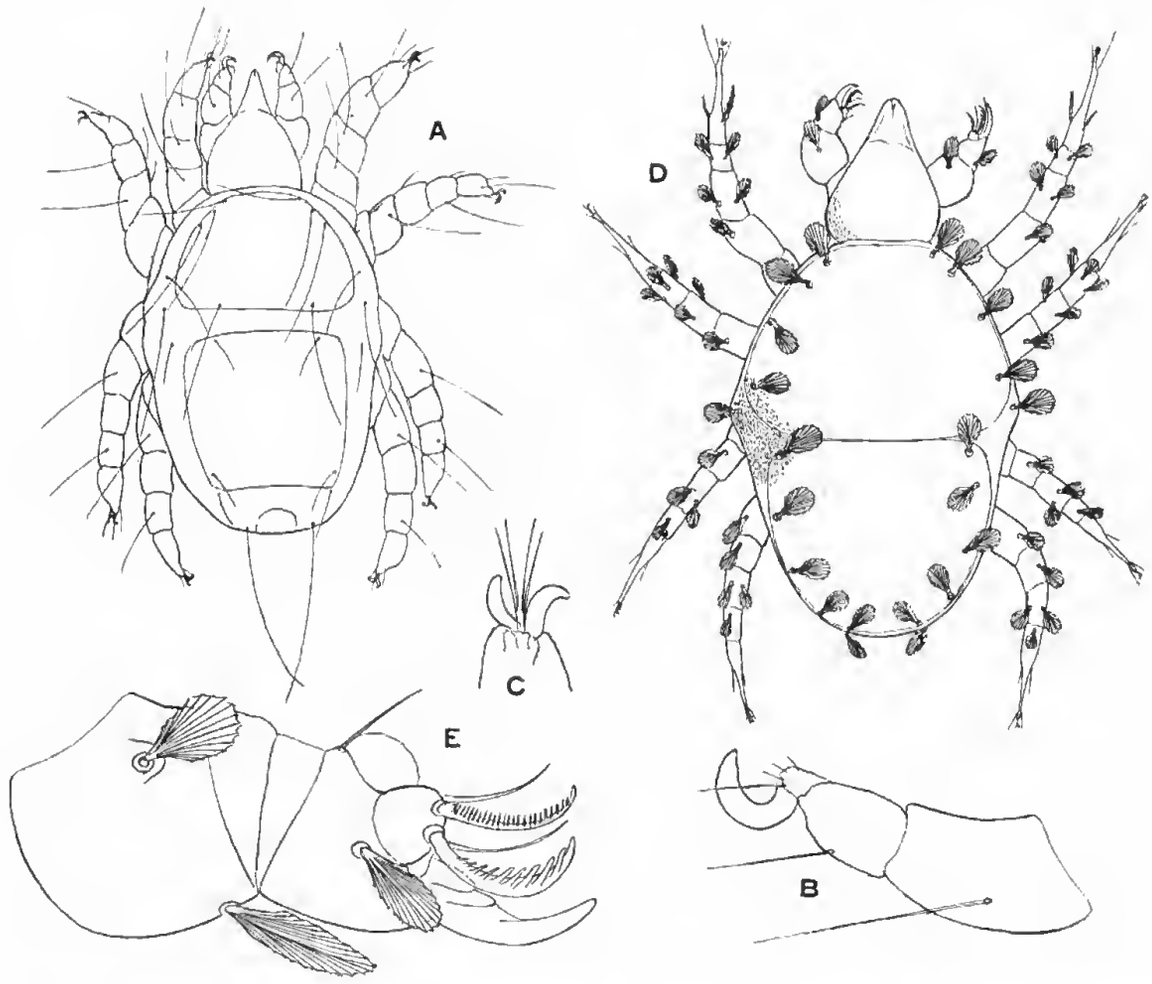

Fig. 6. *Cheletiella pinguis* Berlese. Female; A, dorsal view; B, palp; C, tip of tarsus. *Cheyletiella flabellifera* (Michael). Female; D, dorsal view; E, palp dorsal.

Yacca (*Xanthorrhoea*) stump in Torrens Gorge, South Australia, May, 1939 (R.V.S.). Probably rabbits were nesting nearby.

Genus CHELETONELLA nov.

Allied to *Cheyletia* but distinguished, as in the key, by having only an anterior dorsal shield.

CHELETONELLA VESPERTILIONIS sp. nov.

Text-fig. 7 A–D.

Description. Female. Length 580μ, width 260μ. Gnathosoma 195μ. Eyes ? Palpi strong; femur stout and thick, 67μ long by 72μ wide, tibial claw strong 54μ long, and furnished with three inner basal tubercles, tarsus with two combs

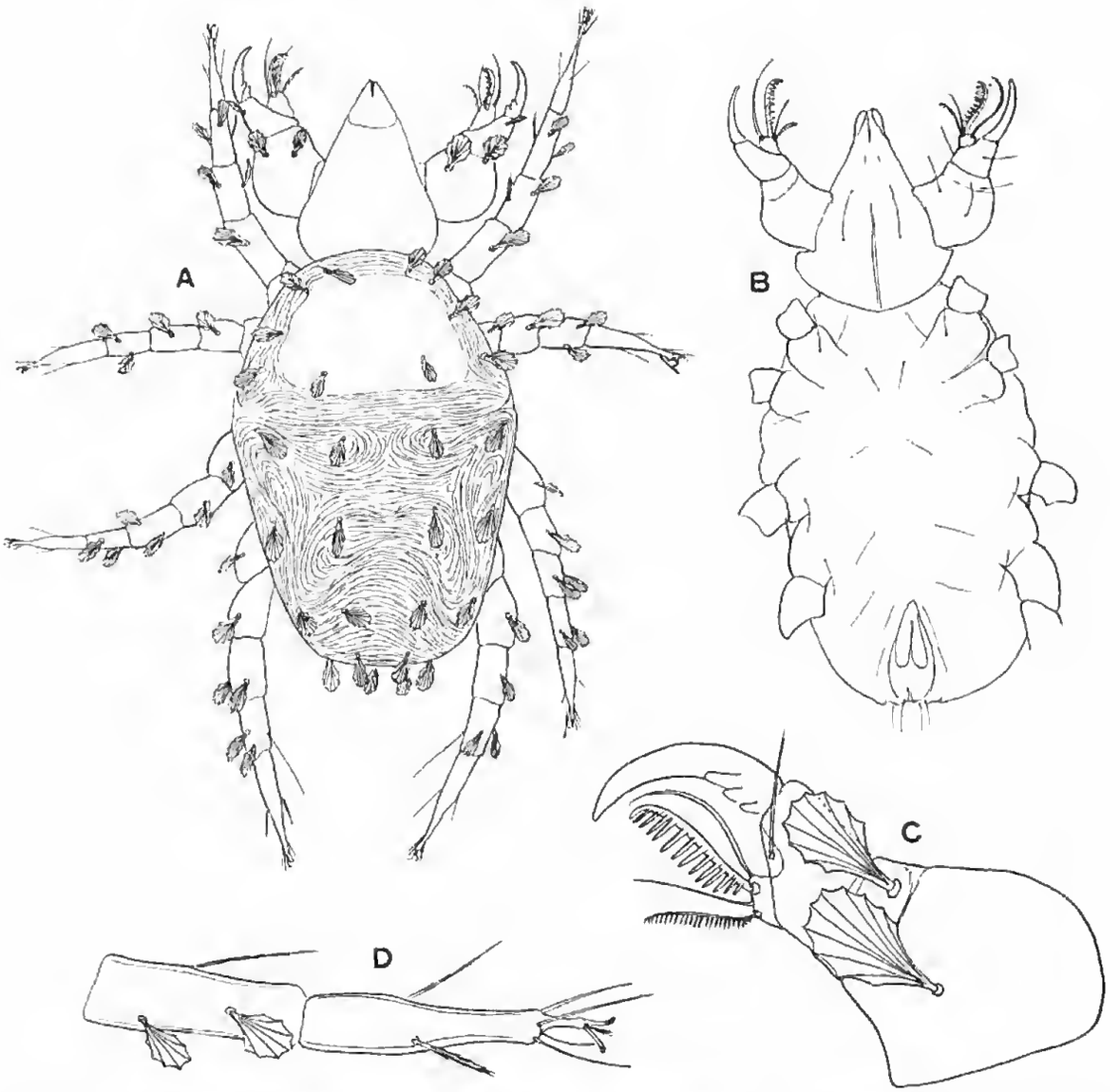

Fig. 7. *Cheletonella vespertilionis* gen. et sp.nov. Female; A, dorsal view; B, ventral view; C, palp from above; D, tibia and tarsus.

and two sichel-like setae, stronger comb with about 12 teeth; femur and tibia each with one fan-like seta. Dorsum with only a single indistinct shield on anterior half. Dorsal setae fan-like, 39μ by 19μ, arranged as figured. Legs comparatively short, I 340μ long, II 250μ, III 290μ, IV 375μ, tarsus as figured with a pair of simple claws and pulvilli of about four hairs. Ventral surface as figured.

Male. Unknown.

Locality and Host. A single specimen taken from a bat at Glen Osmond, South Australia, May, 1933 (D.C.S.).

Genus CHELETOMORPHA Ouds. 1904.

Oudemans, A. C. 1904a, No. 18, 162.

CHELETOMORPHA VENUSTISSIMA (Koch 1839).

Text-fig. 8 A–B.

Koch, C. L. 1839.

This is the genotype and only species of the genus. It is almost cosmopolitan, and is predatory upon other Acarids such as the Tyroglyphidae. My Australian records are:

South Australia: In hay, Two Wells, December, 1933 (D.C.S.); in chaff, Adelaide, May, 1935 (H.W.).
Western Australia: Denmark, July, 1932 (H.W.).

Fig. 8. *Cheletomorpha venustissima* (Koch). Female; A, dorsal view; B, palp dorsal. *Acaropsis docta* Berlese. Female; C, dorsal view; D, palp.

Genus CHELETOPHANES Ouds. 1904.

Oudemans, A. C. 1904a, No. 18, 162.

CHELETOPHANES RUGOSA sp. nov.

Text-fig. 9 A–D.

Description. Female. Length 475μ, width 255μ. Gnathosoma 153μ. Eyes ? 1–1. Palpi strong and stout; femur 62μ by 62μ, tibial claw strong 43μ long and

entirely pectinate along inner edge, tarsus with two combs and two sichel-like setae, stronger comb with about 12–14 teeth which are about one-third the length of comb. Legs: I 600μ long, slender, with two claws and pulvilli as figured; II 390μ; III 410μ; IV 400μ. Dorsum with only anterior shield, this with four pairs of setae, of which the anterior two pairs are longer, about 54μ; setae on hysterosoma beyond those figured are uncertain owing to damage. Cuticle outside of shields rugose.

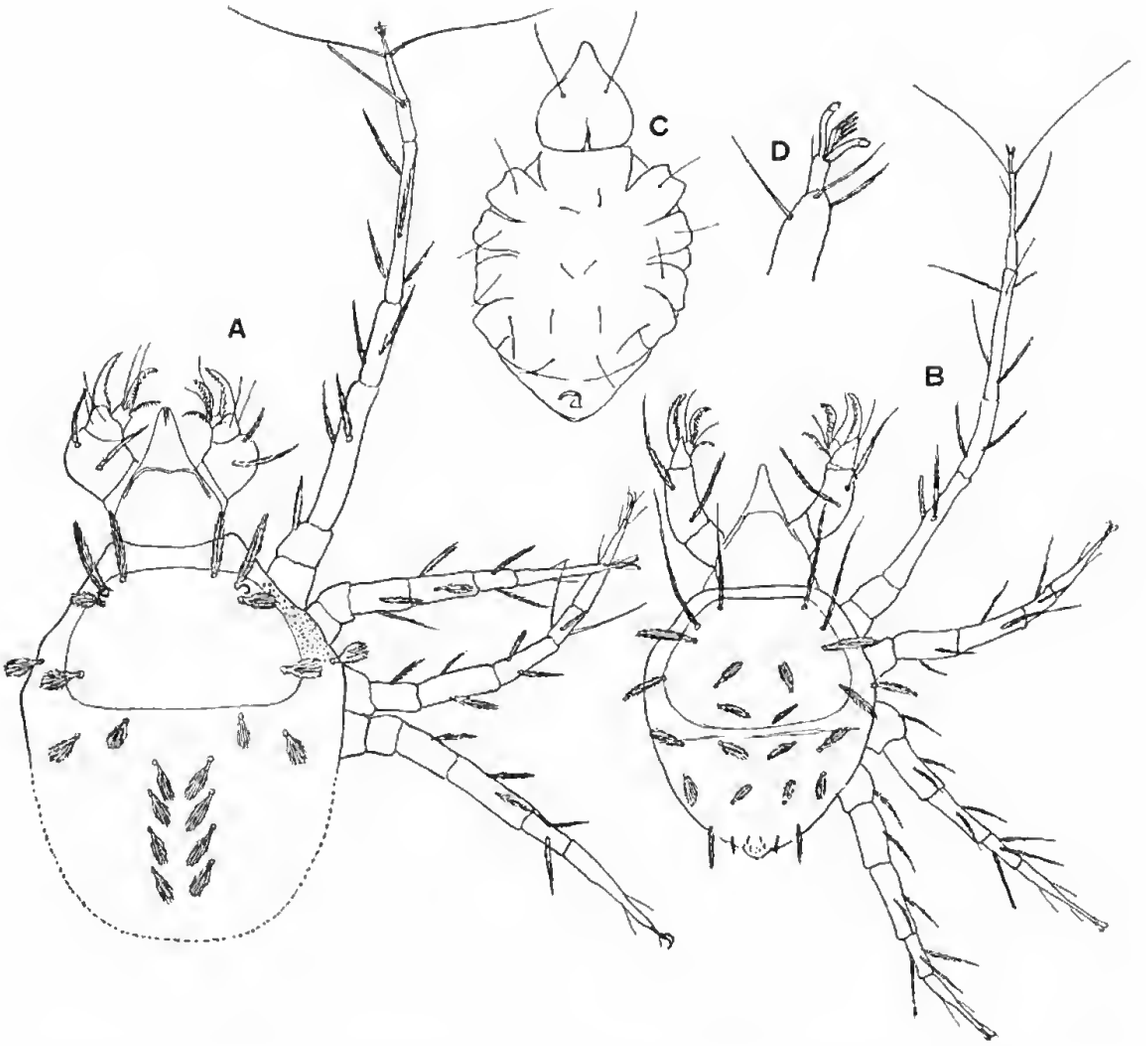

Fig. 9. *Cheletophanes rugosa* sp.nov. A, Female from above. B, Male from above; C, male from below. D, Tip of tarsus.

Male. Length 340μ, width 187μ. Gnathosoma 85μ. Palpi as in female but smaller, femur 54μ long by 43μ wide, claw 40μ and as in female. All other characters as in female.

Locality and Host. From *Calymmaderus* (Coleoptera) material Brisbane, Queensland, December, 1934 (A.R.B.). One female, two males.

Genus ACAROPSIS Moq.-Tand. 1863.

Moquin-Tandon 1863, 314; Oudemans, A. C. 1904, No. 18, 209.

ACAROPSIS DOCTA (Berlese 1886).

Text-fig. 8 C–D.

Berlese, A, 1886.

Frequently found in the dust of human habitations. My Australian records are from Western Australia; from *B. obtectus* culture, Dept. of Agric., Perth; on *Alyssia* sp., Perth, November, 1931 (B.A.O'C.).

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